

Table S-1. Definitions of evaluated causes of death.

<b>Malignant neoplasms of interest</b>	<b>LTAS Minor categories<sup>1</sup></b>	<b>ICD-9 codes</b>
All smoking-related solid cancers <sup>2</sup>	4-13, 15, 16, 20, 26, 27	140-151, 153-157 (excluding 154.2 and 154.3), 161, 162, 180, 188, 189
Digestive	8-14	150-159
Esophagus	8	150
Stomach	9	151
Intestine	10	152-153
biliary liver gall bladder	12	155-156
Pancreas	13	157
Respiratory cancers	15-18	161-165
Larynx	15	161
Trachea, bronchus and lung	16	162
Urinary	26-27	188, 189
Kidney	26	188
Bladder and other urinary sites	27	189
All lymphatic and hematopoietic cancers	37-40	200-208
Non-Hodgkin lymphoma	38	200, 202, 273.3
Multiple myeloma	39	203
Leukemia	40	204-208
Myeloid leukemia	NA	205

1. For the [119-cause](#) LTAS rate file, except for smoking related solid cancers, which excluded cancers of the small intestine and anus.
2. Oral cavity, oropharynx, nasopharynx, and hypopharynx, esophagus (adenocarcinoma and squamous-cell carcinoma), stomach, colorectum, liver, pancreas, nasal cavity and paranasal sinuses, larynx, lung, uterine cervix, ovary (mucinous), urinary bladder, kidney (body and pelvis), and ureter.

Abbreviations: LTAS, (NIOSH) Life Table Analysis System; ICD, International Classification of Diseases; NIOSH, National Institute for Occupational Safety and Health

Table S-2. Characteristics of the job-exposure matrix

<b>Characteristic</b>	<b>Plant 1</b>	<b>Plant 2</b>
Work history records		
Number of records	2351	7346
Number of unique work assignments	316	406
Number of exposure groups (collapsed jobs)	19	13
8-hour Time-weighted average personal air samples		
Number collected	228	171
Mean (ppm)	41.8	68.6
Median (ppm)	31.7	53.5
Interquartile range (ppm)	15.9 - 54.3	33.7 - 84.1
Maximum (ppm)	684	238

Table S-3. Hazard ratios at 50 ppm-years styrene (no lag) by exposure trimming and adjustment for socioeconomic status (SES).

Outcome	Cases	Without SES adjustment <sup>2</sup>		With SES adjustment <sup>2</sup>	
		Full Data	Exposure <500 ppm-years	Full Data	Exposure <500 ppm-years
Smoking related solid cancers <sup>1</sup>	358	0.97 (0.87 to 1.05)	1.03 (0.91 to 1.14)	0.96 (0.86 to 1.04)	1.01 (0.90 to 1.13)
MN digestive	132	0.98 (0.82 to 1.11)	1.06 (0.85 to 1.26)	0.98 (0.81 to 1.10)	1.04 (0.84 to 1.25)
MN esophagus	18	0.99 (0.51 to 1.30)	1.06 (0.53 to 1.59)	1.00 (0.52 to 1.31)	1.07 (0.53 to 1.61)
MN stomach	11	0.24 (NC to 1.99)	0.22 (NC to 1.99)	0.17 (NC to 1.83)	0.17 (NC to 1.83)
MN intestine	37	1.06 (0.71 to 1.28)	1.17 (0.73 to 1.67)	1.05 (0.70 to 1.27)	1.15 (0.72 to 1.64)
MN biliary liver gall bladder	24	1.06 (0.78 to 1.27)	1.18 (0.82 to 1.57)	1.06 (0.78 to 1.27)	1.18 (0.82 to 1.57)
MN pancreas	36	0.87 (0.48 to 1.13)	0.90 (0.48 to 1.32)	0.86 (0.47 to 1.12)	0.88 (0.47 to 1.30)
MN respiratory	187	0.86 (0.70 to 1.00)	0.88 (0.71 to 1.05)	0.85 (0.69 to 0.99)	0.87 (0.70 to 1.04)
Lung	182	0.86 (0.70 to 1.00)	0.88 (0.70 to 1.05)	0.84 (0.68 to 0.99)	0.86 (0.69 to 1.03)
MN urinary	28	1.19 (0.99 to 1.38)	1.45 (1.13 to 1.81)	1.19 (0.99 to 1.38)	1.46 (1.13 to 1.82)
MN kidney	12	1.13 (0.83 to 1.38)	1.31 (0.90 to 1.77)	1.15 (0.84 to 1.40)	1.34 (0.92 to 1.82)
MN bladder & other urinary site	16	1.27 (0.96 to 1.61)	1.63 (1.14 to 2.28)	1.27 (0.96 to 1.60)	1.62 (1.13 to 2.27)
MN lymphatic & hematopoietic	48	1.18 (0.98 to 1.37)	1.36 (1.08 to 1.68)	1.19 (0.99 to 1.38)	1.37 (1.09 to 1.69)
Non-Hodgkin lymphoma	18	1.09 (0.58 to 1.50)	1.12 (0.58 to 1.65)	1.12 (0.59 to 1.53)	1.16 (0.60 to 1.71)
Multiple myeloma	11	1.18 (0.79 to 1.55)	1.53 (0.90 to 2.55)	1.15 (0.77 to 1.52)	1.49 (0.88 to 2.48)
Leukemia	17	1.21 (0.93 to 1.49)	1.46 (1.04 to 1.97)	1.22 (0.93 to 1.50)	1.46 (1.04 to 1.98)
Myeloid Leukemia	10	1.33 (0.86 to 1.83)	1.45 (0.89 to 2.25)	1.32 (0.85 to 1.82)	1.44 (0.88 to 2.24)

1. Oral cavity, oropharynx, nasopharynx, and hypopharynx, esophagus (adenocarcinoma and squamous-cell carcinoma), stomach, colorectum, liver, pancreas, nasal cavity and paranasal sinuses, larynx, lung, uterine cervix, ovary (mucinous), urinary bladder, kidney (body and pelvis), and ureter.
2. All models matched on attained age, sex, race (Caucasian, other), birth cohort (within 5 years), and employment duration (<1year, >1year).

Abbreviations: NC, not calculable; MN, malignant

Table S-4. Leukemia mortality hazard ratios at 50 ppm-years styrene by active worker person-time restriction.

Person-Time Restriction (Yes/No)	Lag (years)	cases	HR at 50 ppm-years (95% CI)		
			Full Data	Exposure <500 ppm-years	RCS Model
10-year lag					
Yes	10	17	1.21 (0.93 to 1.49)	1.46 (1.04 to 1.97)	NA
No	10	18	1.12 (0.92 to 1.28)	1.46 (1.09 to 1.94)	NA
Best Lag					
Yes	37	17	1.15 (0.62 to 1.57)	1.35 (0.68 to 2.08)	4.1 (2.88 to 7.29)
No	36	18	1.14 (0.81 to 1.38)	1.49 (0.95 to 2.19)	3.0 (2.30 to 4.63)

Abbreviations: CI, confidence interval; HR, hazards ratio; NA, not applicable; RCS, restricted cubic spline

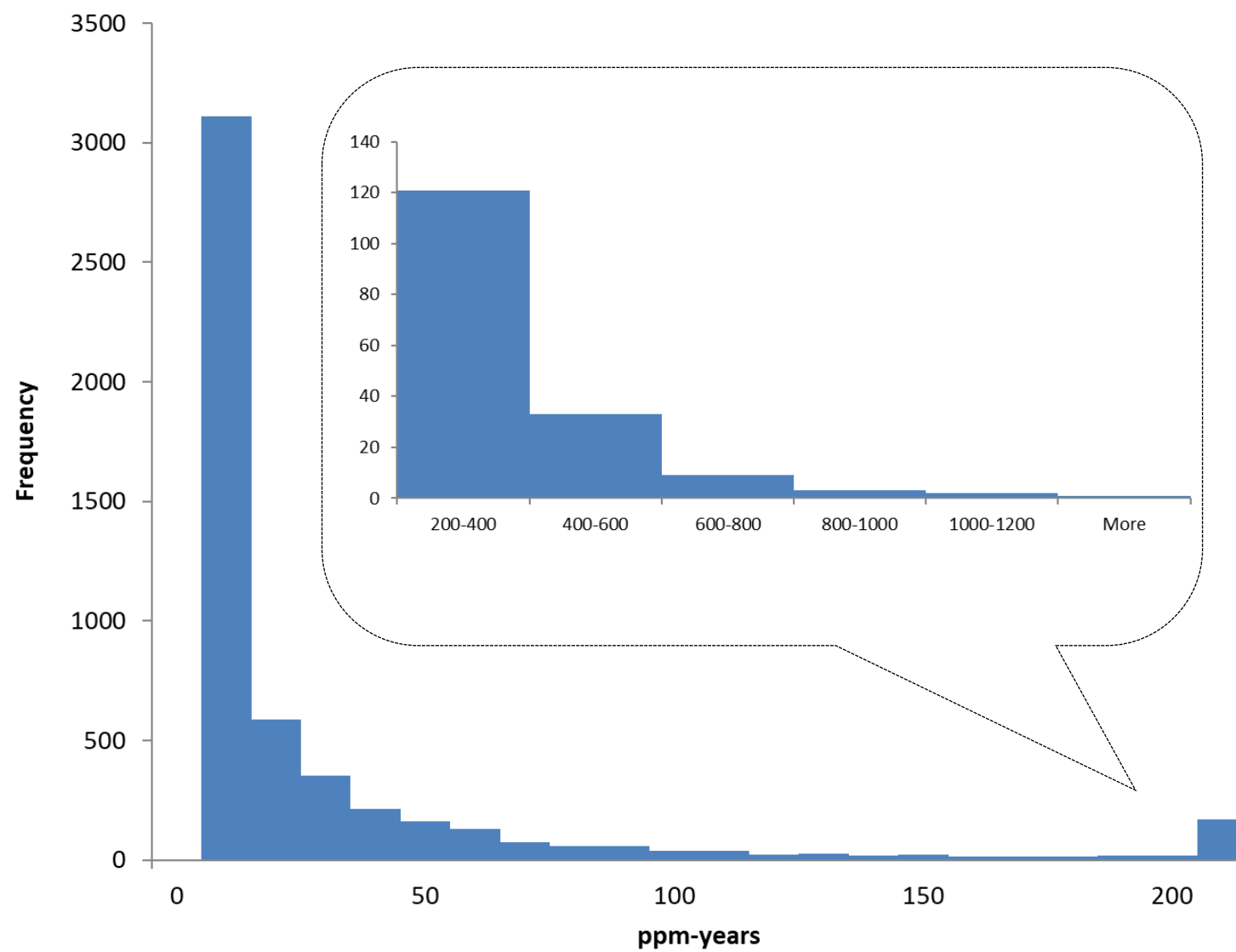


Figure S-1. Histogram of styrene cumulative exposures ( $n=5,163$ ).